U.S. Military Academy - Power Plant (Heating Plant)
East of Williams Road near its junction with Cullum Road
U.S. Military Academy
West Point
Orange County
New York

HABS No. NY-5708-24

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Buildings Survey
National Park Service
Department of the Interior
Washington, DC 20013-7127

HABS No. NY-5708-24
U.S.M.A. No. 604

HABS NY, 36-WE 1/24.

HISTORIC AMERICAN BUILDINGS SURVEY

U.S. MILITARY ACADEMY - POWER PLANT
(HEATING PLANT)

LOCATION: East of Williams Road near its juncture with Cullum Road, U.S. Military Academy, West Point, Orange County, New York.

USGS, West Point Quadrangle, Universal Transverse Mercator Coordinates: 18.587350.4582300.

PRESENT OWNER AND OCCUPANT: U.S. Military Academy, Department of the Army.

PRESENT USE: Power generation for electricity and steam heat.

SIGNIFICANCE: The Power Plant was the first of Cram, Goodhue, and Ferguson's ensemble of collegiate neo-gothic buildings in the Academic Area of the U.S. Military Academy. The Power Plant generated power to light and heat the vast complex of buildings that soon followed. Together with the Riding Hall, connected to the north, the Power Plant forms a strong architectural image of the Academy as viewed from the Hudson River approach.

PART I. HISTORICAL INFORMATION

A. Physical History:

1. Date of erection: 1906-09.

2. Architect: Cram, Goodhue and Ferguson, Architects, New York and Boston. Consulting Engineer: Henry C. Meyer, Jr., Engineer, New York City. Meyer's contract, dated October 7, 1903, was for "designing and supervising the construction and installing of heating and lighting plant." (Annual Report 1906, 1907)

3. Original and subsequent owners: U.S. Military Academy, Department of the Army.

4. Builders, suppliers: The Annual Report of 1907 states that the Empire State Surety Company signed a contract dated May 1, 1907 "for completing contract of Church Construction Co. for construction of power house (except structural steel work)." However, a construction photograph album at the Power Plant indicates that the Thompson-Starrett Company of New York City constructed the building. Contracts listed in the Annual Reports of 1906 and 1907 identify other contractors and suppliers: General Electric Company for "furnishing generators, motor, and switchboard for power house"; the Babcock and Wilcox Company for "furnishing boiler and mechanical draft plant for power house"; the Providence Engineering Works for "furnishing Corliss engines for electrical lighting"; the Robbins Conveying Belt Company for "coal-conveying apparatus";

J.B. and J.M. Cornell Company for "structural steel for power house"; and Hildreth and Company for "inspecting steel for power house." Dickson and Eddy are listed as suppliers of Anthracite coal; Standard Oil was contracted for gas oil; and Penn Gas Coal Company was contracted for gas coal. The Annual Report of 1915 stated that 8112 tons of buckwheat coal had been used in that fiscal year.

Improvements in progress at the Power Plant were listed as $174,132. in 1937 (Annual Report 1937).

5. Original plans and construction: Original drawings exist and are in the possession of the Facilities Engineer, Directorate of Engineering and Housing. These drawings are ink on linen and are from the architectural firm of Cram, Goodhue and Ferguson. Most of the original drawings by the architects and the engineer are dated 1904 and were approved by the War Department in November, 1905. Certain engineering drawings were submitted by the consulting engineer in 1907, noted as drawn by "A. Klein." Other original drawings include some by "E.F.W." in September, 1906 under the direction of Major J.M. Carson, Jr., Quartermaster in charge of construction.

   Alterations to the Power Plant have been confined largely to the interior, and those are due to changes in the electrical generation process. Exterior alterations are minor and also reflect, in some cases, changes in the power generation process.

   The Power Plant was designed as a coal-fired electrical generation plant with steam heat as a by-product. Coal arrived by railroad car and was unloaded in the Ash House onto an 18" conveyor belt (south-north) that took it up an incline to the southeast tower or coal bunker in the Boiler Room. From here the coal was transferred to a vertical bucket conveyor that put it on an 18" lateral conveyor belt (east-west). From this belt the coal was transferred once again to two 16" lateral conveyor belts (south-north) that dropped the coal into piles in the Boiler Room below. Stokers using shovels and wheelbarrows then created a coal pile next to each of the three boilers. Ash was taken out of the Boiler Room via a wheeled vehicle on a steel track to the upper part of the Ash House, above where the coal had first been deposited. Three boilers in the Boiler Room fired three Compound Corliss engines in the adjoining Engine Room to the west. Smoke escaped through a round stack on the northeast corner of the building. (Interview with Mr. R. K. LaPorte and Mr. E. B. Dunn, 22 March 1982, Power Plant, U.S.M.A.)

6. Alterations and additions: One of the first alterations to the Power Plant came in 1909-11 with the construction of the Riding Hall (HABS No. NY-5708-23) to the north. Cram, Goodhue and Ferguson designed the Riding Hall so that the original round smoke stack of the existing Power Plant was incorporated as part of its southeast tower.

   In 1910 the area immediately south of the Power Plant was graded and extended by granite retaining walls, creating a parking lot at the level of the plant's southern entrance. On the southern face of this retaining wall, a large semi-circular arch was constructed around the opening of a railroad tunnel which passed under the parking lot area.

Between 1910 and the 1930s, few alterations took place. One alteration during this period was the addition of an ash chute to facilitate ash removal. A 1921 drawing indicates that a fourth boiler was contemplated but apparently never added.

Steam heat was available immediately upon completion of the Power Plant, as indicated by a steam tunnel drawing of 1908 and Annual Reports. Nevertheless, major work for steam distribution took place between 1932 and 1934, probably due in part to the Academy's physical expansion in the 1930s. It was at this time, 1934, that the second generation engines, direct drive turbines, were installed, replacing the original compound Corliss engines.

In 1937 at least one of the original boilers (#3) was replaced by a Riley Boiler, which still survives. In 1942 an addition was constructed to the south of the Ash House, into which ran two spur railroad tracks. This addition appears to have been demolished by 1952.

Around 1940 a decision was made to switch the Power Plant's fuel from coal to oil. (Interview with Mr. R. K. LaPorte and Mr. E. B. Dunn, 22 March 1982, Power Plant, U.S.M.A.) This decision was followed by a number of alterations carried out in 1945 by the Charles T. Main Company. These included the construction of two fuel oil tanks to the east of the Power Plant; three new boilers; floors cut in the Boiler Room for walkways; conversion of the Ash House into a Pump Room; construction of a Dock Pump House; installation of day storage tanks to the east; new piping for steam and circulating water in the Boiler Room and Engine Room; new lighting fixtures; and a subterranean fuel oil transfer pump room between the tanks. Associated with the conversion was an earthen dike, built around the eastern fuel oil storage tanks in 1946.

In 1947 the Ash House was altered by a 12" concrete block wall constructed to fill its original east opening. The two doors in this wall probably date to this period. It might have been at this same time that the 1942 Ash House addition was demolished, necessitating the new wall to enclose the Pump Room. A small power house sub-station was constructed in brick south of the Ash House in 1949.

North of the Power House concrete sidewalks were constructed in 1950 on a terrace that separates the building from the Riding Hall (HABS No. NY-5708-23). At this same time pipe railings were placed at the stairs and around the window light wells (created by the terrace) on the north elevation.

A major alteration affecting the exterior appearance of the building took place in 1955. Drawings by Castelli in the Office of the Facilities Engineer indicate that all of the original wooden windows were removed and replaced by stacked steel casement windows of 3, 4 and 5 lights with a steel plate filler above and below each casement.

Relatively little was done to alter the exterior of the Power Plant in the 1960s. Changes generally consisted of repairs, such as the repointing of the parapet walls with a polysulfide compound in 1965. The interior was, however, altered in 1967. At that time two new Keeler boilers (#1 and #2) replaced earlier boilers. It was probably at this

time that the Coal Bunker floor in the Boiler Room was cut-open in the middle, only leaving the original concrete floor on the extreme north and south ends. A metal grate floor replaced the original floor in the 1960s.

The Boiler Room was further altered in 1975 by the application of metal wall panels and a hung aluminum ceiling.

The most recent alteration occurred at the west stairs in 1980, where their ascending direction was changed from west to north. The granite and limestone sidewall on the north of this platform was removed for the new stairs.

The greatest interior changes have been associated with new technology and new generations of machinery. Ghosts on the quarry tile floor of the Engine Room indicate where some of the original machinery was located, as do interior photographs taken shortly after the building was completed.

Two interior alterations of an unknown date are the addition of a mezzanine deck across the south end of the Engine Room and the change from an original single valve to a double valve door on the east wall of the Engine Room.

In addition to the above mentioned dated alterations, there are a number of undated exterior alterations: west elevation: a temporary wooden door was cut at the north terrace level, leading into the narrow chimney wing. south elevation: a number of windows have been altered with mechanical equipment, air-conditioners and in some cases, bricked-up altogether; louvers have replaced the top sections of the quadrapartite windows on the south elevation of the southeast wing. roof: only the two original skylights of the Engine Room remain; the Boiler Room skylights have been removed or replaced; and other vents and mechanical equipment have been added.

B. Historical Context: For the historical and architectural context of the building within the overall development of West Point see: HABS No. NY-5708, Volume 2: "West Point: An Overview of the History and Physical Development of the United States Military Academy."

PART 11. ARCHITECTURAL INFORMATION

A. General Statement:

1. Architectural character: The Power House was designed by Cram, Goodhue and Ferguson in a neo-gothic style characteristic of their other buildings at the Military Academy. This rather plain granite building is enhanced by gothic details such as buttresses, pointed arches and limestone trim at openings. The asymmetrical nature of the building's gothic design lends itself well to the site's falling grade, creating a multi-leveled structure corresponding to its various functioning parts.

2. Condition of fabric: The Power Plant's physical condition is good due to the utilitarian nature of its design and the durable materials with

which it was constructed. The parapet was repointed in 1965 with a polysulfide compound, but otherwise the stonework remains in excellent condition.

B. Description of Exterior:

1. Over-all dimensions: The Power Plant occupies a site with a falling grade to the east and to the south. Consequently, there are various elevation heights and floor levels. These levels vary from a one story elevation on the north to a 7-8 story elevation on the south and east. Over-all dimensions are approximately 167' (N-S) x 156'-6" (E-W) at the widest points.

   The building is basically designed around two large spaces: the Boiler Room and the Engine Room. The Engine Room on the west side, 97'-10" (N-S) x 80' (E-W), forms a lopsided "T" with the Boiler Room on the west, 59' (E-W) x 158'-6" (N-S at its longest exterior point on the east). Attached to the "T" is a three story, 13' x 18' wing in the south corner and a wing extended south approximately 100' from the southeast corner; the former is an office wing and the latter a coal conveyor system.

2. Foundations: The foundations of the Power Plant consist of brick walls, brick buttresses, spread footings and steel I-beams. Exterior walls range in thickness from 2' to 3'-6" with brick buttresses ranging from 3' to 3'-6"; the interior brick foundation wall that divides the Engine and Boiler room is 1' thick with 1' buttresses. Vertically placed I-beams occur adjacent to the buttresses in the Boiler Room.

3. Walls: The walls of the Power Plant are rock faced granite laid in a random range ashlar pattern similar to Cram, Goodhue and Ferguson's other West Point work of the period. Decorative limestone trim includes: lintels, sills, buttress capitals, beltcourses, parapet coping, parapet embrasures, a door arch, and the jambs and mullions of some windows. Stepped-back buttress piers occur on the west, south and east walls of the Boiler Room.

4. Structural systems, framing: The walls of the Power Plant are load-bearing stone with an interior brick veneer. Steel trusses resting on steel beams and supported by brick piers form the roof framing system. Floors are poured concrete.

5. Ash House: To the south, below the Power Plant, is the Ash House. This is connected via a tunnel to the Coal Bunker in the southeast corner of the Power Plant. The Ash House, into which a spur railroad line ran, is a square, rock-faced random range ashlar structure measuring 33'-4" at its base and 30'-8" at its top. The two story structure is stepped back on all sides at two levels. The arched entrance to the Ash House, on the south side, is filled-up with concrete block. This entrance is flanked by stepped-back cheek walls capped in limestone. Limestone also encircles the building at the top of each setback level and as trim around the single windows on the west, south and east side of the second floor. Connecting the Ash House to the Power Plant is a tunnel 60'-8" long x 5'-6" wide. The tunnel, constructed of the same

granite as the Power Plant, has limestone coping below a frame roof with asphalt shingles.

6. Chimneys: The tall, round chimney stack off of the Boiler Room's northeast corner was incorporated into the southeast tower of the Riding Hall (HABS No. 5708-23) in 1909-11, connecting the two buildings. The form of the stack was changed from round to square when this occurred.

7. Openings:

   a. Doorways and doors: The principal entrance to the Power Plant is on the lower level of the west elevation. This doorway, and a recessed double window above it, are set within a pointed arch. The bi-valve door is set within limestone jambs.

      On the upper level of the west elevation is a pointed arch doorway with a bi-valve door leading into the Engine Room. The steps to this door have been moved from the west to the north side.

      Two secondary single doors occur on the north side of the southeast Coal Bunker projection and on the terrace level of the west elevation next to the chimney.

   b. Windows: The Power Plant's windows are a variety of sizes, and in different combinations, but of the same type. In 1955 the original wooden frame windows were replaced by steel casements with top-hinged vents. These 2, 3 or 4 vent windows are in masonry openings that range from 2'-0" to 3'-2" in width and 3'-11" to 7'-1" in height with the majority being 2'-8" in width and from 4'-9" to 7' in height. The majority of fixed light windows are 1'-4" x 7'-0".

      With the exception of a mullioned double window over the lower entrance on the west elevation, all the windows on this elevation are single casements. Single windows are used exclusively in the three story office wing, and in the Coal Bunker wing. Similarly, double windows are used on the upper north and south elevations of the Engine Room and on the upper north, south and east elevations of the Coal Bunker. The Boiler Room is distinguished by pointed arch masonry openings between buttress piers on the south and east, each containing four grouped casements. The extended Coal Bunker wing and the Ash House have the only windows with limestone mullions and jamb stones. Some casements on the south elevation have been filled with louvers or have been bricked-up.

8. Roof:

   a. Shape, covering: The Power Plant has a flat 3" cinder cement roof with a gravel covering. Two large skylight monitors run east-west over the Engine Room roof while eight flat skylights run north-south over the Boiler Room section. There is also a skylight on the Ash House roof. Round vents are interspersed between the skylights. The roof of the tunnel is covered with asphalt shingles.

Granite parapet walls with limestone coping rise above the roof to conceal it. Limestone embrasures punctuate the parapet only on the east elevation, with one exception on the southwest wall of the Boiler Room.

C. Description of Interior:

1. Floor plans: The interior of the Power Plant is basically composed of two large spaces: the Engine Room and the Boiler Room. Entered directly from the exterior from a door on its west elevation, the Engine Room is a large room with an open truss ceiling. A steel mezzanine deck has been added across its south side. To the east of the Engine Room, and extending past it to the north and south, is the Boiler Room. Extending east from the southeast corner of the building is the Coal Bunker which is connected via a covered tunnel to the Ash House.

   In the southwest corner of the building at the Engine and Boiler Room juncture is a three story wing with a firemen's toilet and locker room on the first floor, an engineer's toilet and locker room on the second floor and the chief engineer's office on the third floor.

   The Ash House, later called the Pump House, is a two story structure whose second floor is slightly smaller than the ground floor.

2. Stairways: Stairways consist of steel stairs on the west side of the Engine Room; concrete stairs from the Engine Room up to the Boiler Room; steel stairs in the Boiler Room; spiral steel stairs in the Coal Bunker wing; and concrete stairs in the office wing.

3. Flooring: The Engine Room has a quarry tile floor with patches indicating where original equipment was removed. The original concrete Boiler Room floor has been cut and altered into a multi-level steel deck in the center; the original concrete floor level can be seen on the extreme north and south ends. The Ash House has a poured concrete floor with reinforcing I-beams.

4. Wall and ceiling finish: The interior walls of the Power Plant are brick, with the exception of the Ash House, which has granite walls. In 1975 the upper Boiler Room walls were covered with metal wall panels. The ceiling of the Boiler Room was covered first with a lath and plaster and later with aluminum, obscuring the skylights.

5. Openings:

   a. Doorways and doors: Interior doorways are not distinguished and generally consist of plain wooden doors.

   b. Windows: The original wooden window frames and trim were replaced with steel casement windows.

6. Original finishings: Surviving in the Engine Room is a first generation compressor in the northwest corner and an instrument panel along the north wall. The instrument panel has been moved and its instruments changed (LaPorte and Dunn interview).

D. Site:

1. General setting and orientation: The Power Plant, like the Riding Hall (HABS No. NY-5708-23) constructed to the north, was built along the edge of the steep rocky bluff that rises above the Hudson River's west bank. This granite outcrop falls away to the south as well as to the east, giving the building higher elevations on those two sides. Just as the Riding Hall seems to rise out of the bare rock on its east side, so the Power House does, both appearing as a unified fortress from the river below.

   To the west of the Power Plant, Williams Road descends to the railroad station (HABS No. NY-5708-29), the south dock and to the river plain. Further to the west is Cullum Road, which runs beneath the Power Plant's southwest neighbor, Mahan Hall. Parallel and to the east of Williams Road are the Hudson River and West Shore Railroad tracks. These tracks enter a tunnel that passes beneath the western part of the Power Plant and continues underneath the Plain. The wall forming the tunnel entrance also acts as a retaining wall for the Power Plant's parking lot just above it to the north.

2. Outbuildings: After the fuel conversion from coal to oil, three oil storage tanks were built at the Power Plant near the Ash House. One tank is located to the west of the coal tunnel and two are to the east. The tank to the west is surrounded by a concrete retaining wall while the two tanks to the east are enclosed by a concrete and earthen berm which connects the Ash House to the rock outcrop to the north.

   Other additions include a brick transformer house built against the southern side of the Ash House and a concrete pad and steel-frame crane at that same location.

PART III. SOURCES OF INFORMATION

A. Architectural Drawings: Original ink-on-linen working drawings are in the Facilities Engineer's Office, Directorate of Engineering and Housing, U.S. Military Academy. Subsequent alteration drawings are also found there.

B. Early Views: Early photographs can be found in the U.S. Military Academy Archives and Special Collections. A photographic album and an exhibit of construction photographs are found at the Power Plant.

C. Interviews: Mr. R. K. LaPorte and Mr. E. B. Dunn, 22 March 1982, Power Plant, U.S. Military Academy. Mr. LaPorte and Mr. Dunn are plant managers.

D. Bibliography:

1. Primary and unpublished sources: Records, U.S. Military Academy Archives and Special Collections. See bibliographic essay in the Lange volume of this project for a listing of record groups.

2. Secondary and published sources:

   Annual Reports, U.S. Military Academy Archives.

Grashof, Bethanie C. "Building Analysis and Preservation Guidelines for Category I and Selected Category II Buildings at the United States Military Academy, West Point, New York," Historic American Buildings Survey, 1983. HABS No. NY-5708.

Lange, Robie S. "West Point: An Overview of the History and Physical Development of the United States Military Academy," Historic American Buildings Survey, 1983. HABS No. NY-5708.

E. Likely Sources Not Yet Investigated: The records of Cram, Goodhue and Ferguson.

PART IV. PROJECT INFORMATION

This documentation is part of a multi-year project sponsored by the National Park Service and the United States Military Academy, explained in the United States Military Academy, HABS No. NY-5708, Volume 1, "Methodology." This written documentation was prepared by Travis C. McDonald, Jr., architectural historian, in 1982-1985 based on fieldwork conducted in 1982.